

# An Assessment of the Practice of Preventive Cardiology in an Academic Health Center

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There is evidence that attention to cardiovascular risk factors will decrease the mortality of atherosclerotic disease. The objective of this study was to ascertain how often cardiovascular risk factors were assessed and modified in inpatients and newly seen outpatients aged 10 to 50 years at the University of Missouri-Columbia Hospital and Clinics. A total of 461 randomly selected inpatient and outpatient charts were reviewed from three departments: family practice, internal medicine, and pediatrics. Each record was assessed for history of smoking, exercise, diet, stress, and familial heart disease, for blood pressure measurement, and for serum lipid profile and glucose determination. With the exception of blood pressure, the risk factors were infrequently assessed in outpatients. Again excepting hypertension, there was little evidence of any attempt to modify those risk factors identified in inpatients or outpatients. Therefore, an educational program in risk factor recognition and modification is needed for primary care physicians.

Cardiovascular disease accounts for approximately 50 percent of all deaths in the United States.<sup>1</sup> The basic cause of atherosclerosis, which accounts for much of this epidemic of cardiovascular disease, has escaped detection. However, a number of risk factors or associated clinical conditions for cardiovascular disease have been identified.<sup>2</sup> The most important modifiable risk factors are cigarette smoking, hypertension, lipid abnor-

malities, diabetes mellitus, and sedentary lifestyle. These risk factors individually increase the risk of atherosclerosis and coronary disease and, when combined, increase risk severalfold.<sup>3</sup>

A decline in cardiovascular mortality has occurred in the last 15 to 20 years, and many authorities attribute some or much of this decline to lifestyle modifications and a reduction in the cardiovascular risk factors in the population as a whole.<sup>4</sup> Goldman and Cook<sup>5</sup> have estimated that over one half of the decline in the cardiovascular mortality is a result of lifestyle changes and modification of the risk factors. Public health authorities have been gratified with the reduction in cardiovascular mortality, but there is a consensus that physicians should give more attention to the prevention of cardiovascular disease in their practices.<sup>6</sup>

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To determine the extent to which primary care physicians address cardiovascular risk factors, the medical records of patients aged 10 to 50 years seen at the University of Missouri-Columbia Hospital and Clinics by family physicians, internists, or pediatricians were reviewed.

## Methods

Four hundred sixty-four inpatient and outpatient medical records were reviewed from the departments of family medicine, internal medicine, and pediatrics. Each of these records was from a patient seen for the first time within the year prior to the chart review. A 15-percent random sample (143 patients) was selected from a computer printout of all patients, aged 10 to 50 years, seen in the Family Medical Care Center for the first time in 1981. A random sample was also chosen from a computer printout of inpatients on the internal medicine (98 charts), family practice (49 charts), and pediatrics (45 charts) services in 1980. Obstetrical patients on the Family Practice Service were excluded. Outpatients with first visits to either the general internal medicine clinic or general pediatrics clinic were randomly selected from the patient log books of these clinics for the year 1981 and for January and February of 1982. Eighty-two outpatient records from the internal medicine clinic and 43 outpatient charts from the pediatrics clinic were reviewed.

Information pertaining to the cardiovascular risk factors was collected using a chart audit form. This form was developed specifically for this project and was pretested on a small subsample of charts. Interobserver reliability with respect to the presence of chart notations was high. The form included reason for first visit, ie, whether it was for a checkup, for insurance, or for complaints referable to cardiovascular disease. Complaints referable to cardiovascular problems included chest pain, high blood pressure, palpitations, and intermittent claudication.

The chart audit assessed three parameters: history, physical examination, and laboratory procedures. Historical items consisted of inquiries about past diagnosis of heart problems, family history of heart disease, past history of high blood pressure, smoking, exercise, diet, stress, occupa-

tion, education, and oral contraceptive use. The abstractor was liberal in interpretation of the records; very brief notations and references to a factor qualified as evidence of inquiry. Targeted examination items consisted of funduscopy, heart size and sounds, blood pressure, weight, and height. Laboratory procedures included electrocardiogram, serum cholesterol determinations, a lipid profile, and blood glucose testing. All visits were scrutinized for evidence of risk factor assessment. New patients in the Family Medical Care Center complete a health history questionnaire, which is then included in the chart. Information recorded only on this form was not considered to constitute evidence of inquiry. If a cardiovascular risk factor or problem was identified, any indication of treatment or recommendation for modification (ie, drug, diet, weight control, exercise, or stress management) was noted.

## Results

Age of the outpatients ranged from 10 to 50 years. The sex distribution was approximately equal except in the Family Medical Care Center, where 70 percent of the study patients were female. None of the patients in the study was seen for complaints related to cardiovascular problems. Most patients had upper respiratory or urinary tract infections, sore throats, gastrointestinal complaints, or similar problems. Very few visits were for general checkups or health maintenance. Little attention was given to past diagnosis of heart disease, cigarette smoking, exercise level, diet, stress, and family history of heart disease in these outpatients (Table 1). Blood pressure and weight were routinely assessed (Table 2). These measurements are regularly performed by the nurses at the time of check-in. Important laboratory procedures in preventive cardiology, serum cholesterol, and blood glucose determinations were infrequently performed.

With hospital inpatients (Table 3) the cardiovascular risk factors were assessed somewhat more frequently. More attention was given to past diagnosis of heart disease, family history of heart disease, and past history of hypertension and smoking. On the other hand, there was little attention to exercise and diet. The serum cholesterol

**Table 1. Percentage of Outpatient Charts in Which Evidence of Inquiry About Risk Factor Was Found**

Risk Factor	Internal Medicine	Family Practice	Pediatrics
Past diagnosis of heart problem	14	14	6
Family history of heart disease	17	16	19
Past history of high blood pressure	3	11	0
Smoking	34	24	6
Exercise	28	8	31
Diet	28	24	28
Stress	35	29	63
Occupation	33	42	3
Education level	32	18	97
Oral contraceptive use (women only)	35	57	43

**Table 2. Percentage of Outpatient Charts in Which Examination Items or Laboratory Procedures Were Recorded**

	Internal Medicine	Family Practice	Pediatrics
Examination			
Funduscopy	37	26	59
Blood pressure	100	99	84
Weight	99	98	97
Height	9	90	97
Laboratory Procedures			
Serum cholesterol	18	8	6
Lipid profile	0	1	0
Blood glucose	17	8	13

was measured in approximately 75 percent of the inpatients and the blood glucose in about 90 percent. Even when risk factors were identified, there was little evidence from the medical records that attempts were made to modify these risk factors in either inpatients or outpatients. There was practically no documentation of patient education concerning smoking, diet, or exercise.

## Discussion

The results demonstrate that primary care physicians do not give a high priority to the risk factors of cardiovascular disease in outpatients at this

health center. Risk factors were assessed more frequently in inpatients, but there was little evidence of attention given to the risk factors once they were identified. Whether this physician behavior is justifiable depends upon whether risk factor assessment and modification are efficacious in preventing cardiovascular disease, a matter of some controversy and uncertainty.

In an attempt to answer the question about the efficacy of risk factor modification, several recent intervention trials have been performed. The Multiple Risk Factor Intervention Trial (MRFIT)<sup>7</sup> evolved from a national commitment to prevent heart disease. MRFIT was a six-year collaborative clinical trial that sought to determine whether the

**Table 3. Percentage of Inpatient Charts in Which Evidence of About Risk Factor Was Found**

Risk Factor	Internal Medicine	Family Practice	Pediatrics
Past diagnosis of heart problem	97	81	20
Family history of heart problem	93	76	66
Past history of high blood pressure	97	74	2
Smoking	100	86	17
Exercise	15	19	71
Diet	39	45	73
Stress	97	93	100
Occupation	97	83	12
Education level	96	69	100
Oral contraceptive use (women only)	84	73	48
Blood pressure	100	100	100
Serum cholesterol	72	76	76
Lipid profile	9	2	5
Blood glucose	88	84	90

modification of multiple risk factors (high blood pressure, elevated serum cholesterol, and cigarette smoking) in high-risk but otherwise healthy adult men would lead to a reduction of mortality. While MRFIT demonstrated reductions in total serum cholesterol, blood pressure, and cigarette smoking in the intervention group, mortality rates in the intervention group and control groups were similar. Interpretation of the MRFIT findings is complicated by the control group also having had some degree of risk factor modification.

Other intervention trials have given more promising results. Hjerrmann et al<sup>8</sup> in Oslo showed a significant reduction in coronary mortality in subjects who lowered their serum cholesterol level by diet and who decreased cigarette smoking when compared with a control group that had less cholesterol reduction and smoking cessation. The World Health Organization European Trial carried out in factories in several countries demonstrated that reduction in coronary artery disease mortality and morbidity appeared to be correlated with the degree of risk factor modification.<sup>9</sup> The Belgian experience was the most successful. In the Belgian study there was a vigorous attempt to educate the intervention group about cigarette smoking, hypertension, exercise, and high cholesterol levels.<sup>10</sup> Subjects receiving the intervention had significant reductions in the preva-

lence of risk factors and experienced a statistically significant reduction in coronary events.<sup>11</sup>

A recent report of the Lipid Research Clinics Coronary Primary Prevention Trial<sup>12</sup> gives strong evidence that lowering elevated serum cholesterol levels will decrease the risk of subsequent coronary mortality and morbidity in men. There was a 50 percent reduction in coronary events in those subjects with a 25 percent decrease in low-density lipoprotein cholesterol.

Thus there is increasing evidence that risk factor modification may be useful in preventing coronary artery disease. The favorable evidence is most impressive in regard to cigarette smoking, hypertension, and serum cholesterol. If physicians neglect to inquire about cigarette smoking and fail to measure serum cholesterol, they cannot be effective in prevention of subsequent coronary disease. Surveys show that the public feels that advice about changes in lifestyle habits is most favorably received if it comes from a personal physician.<sup>13</sup> Physicians, therefore, have an opportunity to address such issues and a potential to facilitate beneficial changes in lifestyle and behavior.

In this study frequent use of drugs for the treatment of hypertension was noted, but there were few documented attempts at risk factor modification in the areas of cigarette smoking,

high blood cholesterol, physical inactivity, diet, and emotional stress. Chart audit showed that physicians in the primary care areas of internal medicine, family medicine, and pediatrics were addressing little attention to cardiovascular risk factors in outpatients at the University of Missouri-Columbia Health Sciences Center.

Investigations among childhood populations indicate that behavior patterns and risk factors developed in childhood may track into adult life.<sup>14</sup> Prevention of the emergence of these risk factors may improve the cardiac health of adults. Even at the age of 10 years a child needs to be educated concerning behavioral risk factors relating to smoking, physical activity, and diet.<sup>15</sup> The results reported here show that pediatricians and family physicians are infrequently addressing cardiovascular risk factors in children in the outpatient setting. Although risk factor assessment was performed more frequently in inpatients, the large majority of the young population will not be hospitalized.

Chart auditing has some limitations as a method of evaluating the practice of preventive cardiology. There may be differences between the content of the physician-patient encounter and its documentation in a chart. Assessment or discussion of risk factors occurring during the transaction may not be recorded, especially if inquiries elicited negative responses. An audit, however, revealed that numerous family practice patients reported risk factors on the self-administered health history questionnaire that were not subsequently addressed in physicians' notes. Thus, while the chart audit may underestimate the assessment of cardiovascular risk factors, the data suggest significant deficiencies in this practice activity.

Most of the patients in this study did not come to physicians asking for risk factor assessment. However, encounters for minor illnesses of various types may provide the physician the only chance to practice preventive cardiology, since many patients do not seek systematic medical care and come in only for episodic illnesses. It is disappointing that so little attention is given to preventive cardiology in general when there is such an enormous effort at great expense for the largely palliative therapy of advanced cardiovascular disease.<sup>1</sup>

The new data concerning the efficacy of risk factor modification warrant an aggressive attempt at public and physician education to assure that the risk factors are assessed and modification is attempted in adolescents and young adults.

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